

SAT Math test

March 2023

№1. The total profit p , in dollars, from producing and selling x units of barbecue grills is given by the function $p(x) = kx - (b + 500)$, in which k and b are constants. When 120 barbecue grills were produced and sold, the total profit was \$15 000 and when 200 barbecue grills were produced and sold, the total profit was \$27 000. What is the value of b ?

009 7

№2. Arnold purchased a shirt and a pair of running shoes. The price of the shirt was s dollars and the price of the running shoes was 10 dollars less than twice the price of the shirt. He paid 8% tax for both the shoes and the shirt. If he paid 50% of the total purchase price with his debit card and paid the rest with cash, how much cash, in dollars, did he pay in terms of s ?

1.62s - 5.4

№3. A car traveled at an average speed of 65 miles per hour for 4 hours and consumed fuel at a rate of 32 miles per gallon. If the price of gasoline was \$2.79 per gallon, what was the cost of gasoline, to the nearest cent, for the four hour trip?

22.67

№4. The table below shows some values of the linear function f . Define this function.

x	-3	-1	1	3
$f(x)$	-1	0	1	2

$\frac{7}{1} + x\frac{7}{1} = (x)f$

Questions 5 and 6 refer to the following information.

$$A = \frac{180(n - 2)}{n}$$

The formula above shows the relationship between A , the measure of each angle of a regular polygon, and n , the number of sides of a regular polygon.

№5. Express the number of sides in terms of the measure of an angle.

$$\frac{V - 081}{09E} = u$$

№6. For what number of sides will the measure of an angle be 144° ?

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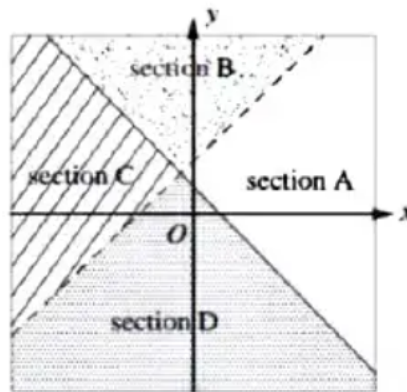
№7. If $5 - n \geq 2$, what is the greatest possible value of $n + 2$?

5

№8. Consider the system of inequalities:

$$\begin{cases} x - y < -2 \\ x + y \geq 1 \end{cases}$$

A graph of the system is shown below.



Which section of the graph could represent all of the solutions to the system?

Section B

№9. A cubic meter of titanium weighs 4,540 kilograms. How much will 2 000 cubic centimeters of titanium weigh, in kilograms? (1 m = 100 cm)

9.08 kg

№10. When number n is divided by $\frac{2}{3}$, the result is the same as 6 less than $2n$. What is the value of $\frac{2}{3}n$?

8

Questions 11 and 12 refer to the following information.

Danny needs \$450 to buy an iPad. He has already saved \$120. He plans to earn the rest of the money by working at an office supply store. His savings can be modeled by the equation

$$y = 9.5x + 120,$$

in which x represents the number of hours he worked at the office supply store, and y represents his total savings.

№11. Which of the following best describes the meaning of the number 9.5 in the equation?

- A) The number of hours Danny works for the office supply store in one day.
- B) The number of hours Danny works for the office supply store in one week.
- C) The amount Danny gets paid per day from the office supply store.
- D) The amount Danny gets paid per hour from the office supply store.

D

№12. What is the minimum number of hours Danny needs to work at the office supply store to save enough money to buy an iPad?

38 hours

№13. If the average (arithmetic mean) of 2, a , and b is $2x$, what is the average of a and b in terms of x ?

$1 - x$

№14. If a equals 120 percent of a number, then 40 percent of that number is

$\frac{a}{n}$

№15. The equation below expresses the height h , in meters, of an object t seconds after it is thrown into the air from the ground with an initial speed of 40 meters per second.

$$h = -4.9t^2 + 40t$$

After approximately how many seconds will the object reach its highest point? Round the answer to the nearest integer.

$\frac{1}{n}$

№16. The graph of a line on the xy -plane passes through points $(-3, 1)$ and $(3, 5)$. The graph of a second line contains the point $(6, 0)$. If the two lines are parallel, what is the y -intercept of the second line?

$\frac{1}{n}$

№17. The length and width of a large picture are respectively 18 inches and 12 inches. If each dimension is reduced by x inches to make the ratio of length to width 5 to 3, what is the value of x ?

$\frac{a}{n}$

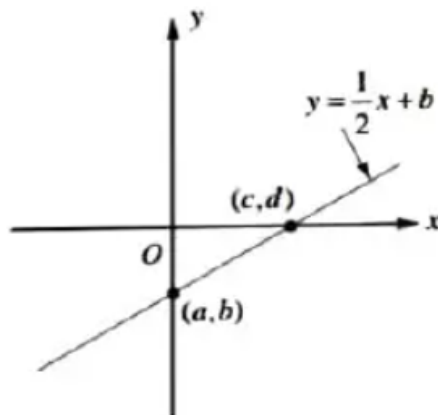
№18. In a music store, 25% of the compact discs are classical. Out of these, 60% are on sale. If not more than 450 classical CDs are on sale, what could be the maximum number of CDs in the store?

000 $\frac{a}{n}$

№19. In the graph below, line

$$y = \frac{1}{2}x + b$$

intersects the y -axis at point (a, b) and intersects the x -axis at point (c, d) .



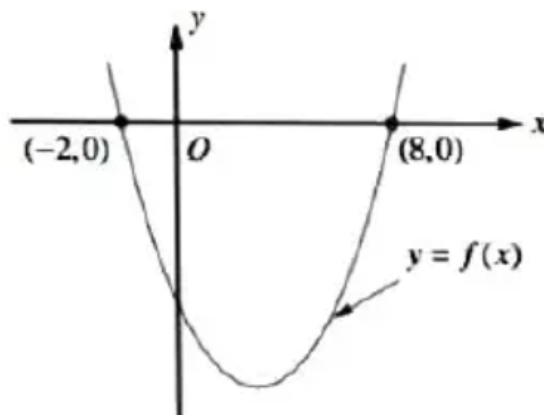
If the value of b is equal to -3.5 , what is the value of c ?

L

№20. If $y = kx^2$, in which k is a constant, and $y = -12$ when $x = -4$, what is the value of y when $x = 2$?

8-

№21. In the xy -plane below, $(-2, 0)$ and $(8, 0)$ are the two x -intercepts of the graph of f .



If the minimum value of f is $-\frac{25}{2}$, what is the y -intercept of the graph of f ?

8-

№22. In the polynomial $f(x) = -2(x^2 + 7x - 3) - a(x + 2) + 1$, a is a constant. If $f(x)$ is divisible by x , what is the value of a ?

№23. In the function $f(x) = \frac{1}{3}x - k$, k is a constant. If $f(-3) = k$, what is the value of $f\left(-\frac{3}{2}\right)$?

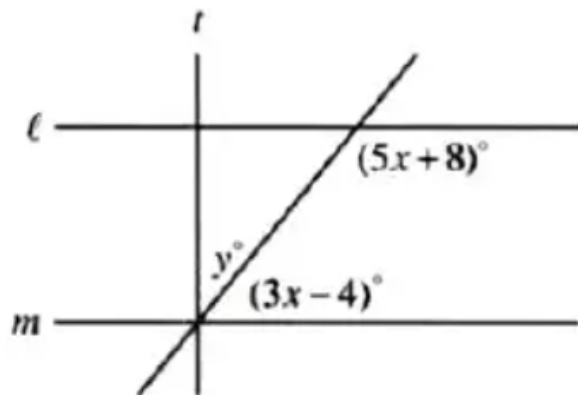
№24. The value V , in dollars, of an artist's painting t years after it was purchased is given by the function

$$V(t) = 5\,000 \cdot 4^{\frac{t}{10}}.$$

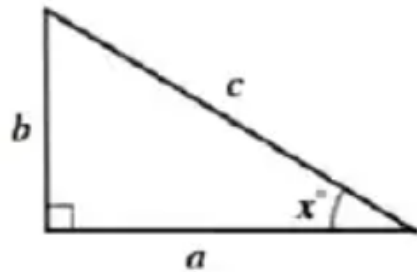
What is the value, in dollars, of the painting 15 years after it was purchased?

№25. A water tank in the shape of a rectangular prism has a base length of 6 meters and a base width of 4 meters. In the morning, 120 cubic meters of water from the tank was used for planting. In the afternoon, 125 percent more than the amount of water used in the morning was pumped into the tank. What is the increase in the height of the water after the water was pumped into the tank, in meters?

№26. In the figure below, $\ell \parallel m$ and $t \perp \ell$ (note that the figure is not drawn to scale). What is the value of y ?



№27. In the right triangle ABC below, which of the statements must be true?



I. $\sin x^\circ = \frac{b}{c}$

II. $\cos(90 - x)^\circ = \frac{b}{c}$

III. $\sin(90 - x)^\circ = \frac{b}{c}$

None III are I

№28. Derek paid \$82 for one beanie and one mitten. If the beanie cost \$8 more than the mitten, how much did Derek pay for the beanie?

47

№29. If the slope of a line in the xy -plane that passes through the points $\left(\frac{1}{2}, -1\right)$ and $(2, b)$ is $\frac{8}{3}$, what is the value of b ?

8

№30. If x and y are positive integers,

$$x^2 - y^2 = \frac{8}{9},$$

and

$$x^2 + 2xy + y^2 = \frac{16}{9},$$

what is the value of $x - y$?

$\frac{8}{7}$

№31. In the figure above, the radius of circle O is 3. The line segment PQ is tangent to circle O and $OR = RP$. If the area of the shaded region is $k\pi$, what is the value of k ?

$\frac{7}{8}$
